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(54) **Title**: MIXER TRUCK

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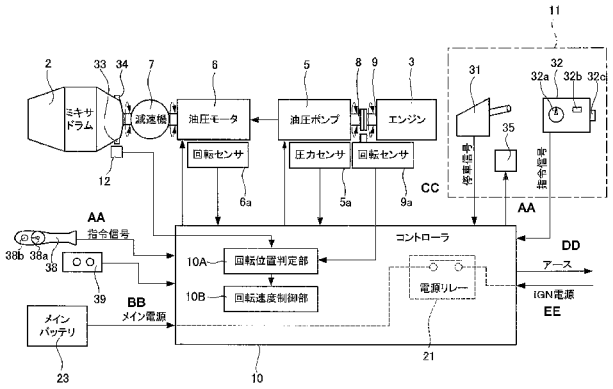


2 Mixer drum
3 Engine
5 Hydraulic pump
5a Pressure sensor
6 Hydraulic motor
6a, 9a Rotation sensor
7 Decelerator
10 Controller
10A Rotational position determination unit
10B Rotational velocity control unit
21 Power source relay
23 Main battery
AA Command signal
BB Main power source
CC Vehicle stop signal
DD Earth
EE IGN power source

(57) **Abstract**: This mixer truck (100) is provided with a mixer drum (2) in which ready-mixed concrete can be loaded, blades (13, 14) which are provided inside of the mixer drum (2) and which extrude the ready-mixed concrete from the mixer drum (2), a drive device (4) which rotationally drives the mixer drum (2), and a controller (10) which controls the rotational velocity of the mixer drum (2), wherein the controller (10) is provided with a rotational position determination unit (10A) which determines when the blades (13, 14) have reached a prescribed rotational position, and a rotational velocity control unit (10B) which decreases the rotational velocity of the mixer drum (2) to less than the normal rotational velocity on the basis of the determination result of the rotational position determination unit (10A).

(57) 要約: ミキサ車（１００）は、生コンクリートを搭載可能なミキサドラム（２）と、ミキサドラム（２）の内側に設けられミキサドラム（２）から生コンクリートを押し出すブレード（１３、１４）と、ミキサドラム（２）を回転駆動する駆動装置（４）と、ミキサドラム（２）の回転速度を制御するコントローラ（１０）と、を備え、コントローラ（１０）は、ブレード（１３、１４）が所定の回転位置に来たことを判定する回転位置判定部（１０Ａ）と、回転位置判定部（１０Ａ）の判定結果に基づいてミキサドラム（２）の回転速度を通常回転速度より低くする回転速度制御部（１０Ｂ）と、を備える。

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DESCRIPTION

# MIXER TRUCK

## TECHNICAL FIELD

[0001] The present invention relates to a mixer truck capable of loading ready-mixed concrete.

## BACKGROUND ART

[0002] JP2012-228830A discloses a mixer truck including a rotating drum rotatably mounted on a vehicle body, a hopper for leading ready-mixed concrete input into an inlet and outlet of the rotating drum, and a discharge chute for receiving the ready-mixed concrete discharged from the inlet and outlet of the rotating drum and discharging it to the outside.

[0003] The mixer truck has a spiral-shaped blade protruding from an inner wall of the rotating drum. When the ready-mixed concrete is discharged, the rotating drum rotates in one direction and the blade pushes out the ready-mixed concrete to the inlet and outlet.

## SUMMARY OF INVENTION

[0004] However, in such a prior-art mixer truck, during a discharge operation for discharging the ready-mixed concrete through an opening portion of the rotating drum, there is a problem that a discharge amount of the ready-mixed concrete pushed out by the rotating blade cyclically increases and decreases.

[0005] The present invention has an object to provide a mixer truck capable of suppressing the cyclic increase and decrease of the discharge amount of the ready-mixed concrete.

[0006] According to one aspect of the present invention, a mixer truck includes a mixer drum configured to load ready-mixed concrete; a blade provided inside the mixer drum and configured to push out the ready-mixed concrete from the mixer drum; a driving device configured to rotate the mixer drum; and a controller configured to control a rotating speed of the mixer drum. The controller includes a rotation position determining unit configured to determine that the blade has come to a predetermined rotation position, and a rotating speed control unit configured to set the rotating speed of the mixer drum lower than an ordinary rotating speed on the basis of a determination result of the rotation position determining unit.

## BRIEF DESCRIPTION OF DRAWINGS

[0007] FIG. 1A is a plan view of a mixer truck according to a first embodiment of the present invention;

FIG. 1B is a side view of the mixer truck;

FIG. 2 is a control block diagram illustrating constitution of the mixer truck;

FIG. 3A is a characteristic diagram illustrating a relation between a rotating angle of a mixer drum according to the mixer truck and a discharge amount of ready-mixed concrete as a comparative example;

FIG. 3B is a timing chart illustrating control contents of a controller according to the first embodiment of the present invention; and

FIG. 4 is a control block diagram illustrating constitution of a mixer truck according to a second embodiment of the present invention.

## DESCRIPTION OF EMBODIMENTS

[0008] Embodiments of the present invention will be described below by

referring to the attached drawings.

[0009]

(First embodiment)

Entire configuration of a mixer truck 100 will be described by referring to Figs. 1A and 1B.

[0010]

The mixer truck 100 is a vehicle including an operator's cabin 11 and a base 1. The mixer truck 100 includes a mixer drum 2 mounted on the base 1 and capable of loading ready-mixed concrete, a driving device 4 for rotating and driving the mixer drum 2, and a controller 10 for controlling rotation of the mixer drum 2. The mixer truck 100 loads the ready-mixed concrete in the mixer drum 2 and transports it. In Fig. 1B, the driving device 4 and the like are not shown.

[0011] The mixer drum 2 is a cylindrical container having a bottom rotatably mounted on the base 1 and has an opening portion 2A on a rear end thereof. The mixer drum 2 is mounted with inclination so that its rotating axis O becomes gradually higher from a front part of the vehicle toward the rear part.

[0012] On a rear upper part of the opening portion 2A of the mixer drum 2, a hopper 16 is provided. The ready-mixed concrete put into the opening portion 2A is led by the hopper 16 to the opening portion 2A. On a rear lower part of the opening portion 2A of the mixer drum 2, a flow guide 17 and a chute 18 are provided. The ready-mixed concrete discharged from the opening portion 2A is led by the flow guide 17 to the chute 18 and is discharged by the chute 18 in a predetermined direction.

[0013] Inside the mixer drum 2, band-shaped first and second blades 13 and 14 protruding from the inner wall thereof and spirally extending are

provided. The first and second blades 13 and 14 are arranged so as to have a phase difference of 180 degrees to each other with respect to the rotating center axis O.

[0014] During input of the ready-mixed concrete into the mixer drum 2 and agitation or kneading, the mixer drum 2 is rotated in a counterclockwise direction (forward driving) when the mixer drum 2 is seen from the rear (right end side in Fig. 1B). The ready-mixed concrete in the mixer drum 2 is fed from the rear to the front of the mixer drum 2 (from the right to the left in Fig. 1B) by the rotating first and second blades 13 and 14. As a result, the ready-mixed concrete is agitated or kneaded and solidification thereof is prevented.

[0015] During discharge of the ready-mixed concrete with respect to the mixer drum 2, the mixer drum 2 is rotated in a clockwise direction (backward driving) when the mixer drum 2 is seen from the rear. The ready-mixed concrete in the mixer drum 2 is fed from the front to the rear of the mixer drum 2 (from the left to the right in Fig. 1B) by the rotating first and second blades 13 and 14 and is discharged from the opening portion 2A of the mixer drum 2.

[0016] The mixer drum 2 is rotated and driven by using an engine 3 for running mounted on the mixer truck 100 as a power source. The driving device 4 is driven by rotation of an engine 3 and rotates and drives the mixer drum 2 by a fluid pressure of an operating fluid.

[0017] A rotary motion of a crank shaft in the engine 3 is transmitted to the driving device 4 by a power take-off mechanism 9 (PTO: Power take-off) for taking out power from the engine 3 at all times and a drive shaft 8 (see Fig. 2) connecting the power take-off mechanism 9 and the driving device 4 to each other.

[0018] As illustrated in Fig. 2, in the power take-off mechanism 9, a

rotation sensor 9a for detecting a rotating speed of the engine 3 and outputting a rotation speed signal according to the detected rotating speed to the controller 10 is provided. It may be so configured that the rotating speed of the drive shaft 8 is detected by using the rotation sensor 9a.

[0019] In the driving device 4, an operating oil is used as the operating fluid. Instead of the operating oil, another non-compressive fluid may be used as the operating fluid. The driving device 4 includes a hydraulic pump 5 as a fluid pressure pump driven by the engine 3 and discharging the operating fluid and a hydraulic motor 6 as a fluid pressure motor driven by the hydraulic pump 5 and rotating and driving the mixer drum 2. The driving device 4 is capable of forward and backward rotation and acceleration and deceleration of the mixer drum 2.

[0020] The hydraulic pump 5 is rotated and driven by power taken out of the engine 3 through the power take-off mechanism 9 at all times. Therefore, a rotating speed of the hydraulic pump 5 is largely affected by a change in the rotating speed of the engine 3 accompanying a running state of the vehicle. Thus, in the mixer truck 100, the rotating speed of the hydraulic motor 6 is controlled by the controller 10 so that the mixer drum 2 is in a target rotation state in accordance with the rotating speed of the engine 3.

[0021] The hydraulic pump 5 is a swash-plate type axial piston pump with variable capacity. The hydraulic pump 5 receives a control signal from the controller 10 and switches a tilt angle of the swash plate (not shown) to a forward rotation direction or a backward rotation direction. The hydraulic pump 5 includes an electromagnetic valve (not shown) for adjusting the tilt angle. The hydraulic pump 5 has its discharge direction and a discharge capacity adjusted by switching of the electromagnetic valve.

[0022] The operating oil discharged from the hydraulic pump 5 is supplied

to the hydraulic motor 6, and the hydraulic motor 6 is rotated. The rotation of the hydraulic motor 6 is transmitted to the mixer drum 2 through a decelerator 7.

[0023] As illustrated in Fig. 2, in the hydraulic pump 5, a pressure sensor 5a as a pressure detector for detecting a pressure of the discharged operating oil is provided. The pressure sensor 5a outputs a load pressure signal to the controller 10 according to the detected pressure of the operating oil. It may be so configured that the pressure sensor 5a is provided not in the hydraulic pump 5 but in the hydraulic motor 6 so that the pressure of the operating oil in the hydraulic motor 6 is detected by the pressure sensor 5a. As described above, the pressure sensor 5a detects the pressure of the operating oil in the driving device 4.

[0024] The hydraulic motor 6 is a swash-plate type axial piston motor with variable capacity. The hydraulic motor 6 is rotated and driven upon receipt of the supply of the operating oil discharged from the hydraulic pump 5. The hydraulic motor 6 includes an electromagnetic valve (not shown) for adjusting the tilt angle of the swash plate (not shown) by receiving a two-speed switching signal from the controller 10. The capacity of the hydraulic motor 6 is switched in two stages, that is, a small capacity for high-speed rotation and a large capacity for normal rotation by switching of the electromagnetic valve. In the hydraulic motor 6, a rotation sensor 6a (see Fig. 2) as a rotating speed detector for detecting a rotating speed V of its output shaft (not shown) is provided.

[0025] The controller 10 controls an operation of the driving device 4. Specifically, the controller 10 is constituted by a microcomputer including a CPU (central processing unit), a ROM (read only memory), a RAM (random access memory), an I/O interface (input/output interface) and the like. The

RAM stores data in processing of the CPU, the ROM stores a control program of the CPU and the like in advance, and the I/O interface is used for input/output of information with a connected device. By operating the CPU, the RAM and the like in accordance with the program stored in the ROM, control of the driving device 4 is realized.

[0026] As illustrated in Fig. 2, when an operator operates an ignition switch (not shown) in the operator's cabin 11 so as to start the engine 3, an ignition power supply is input into the controller 10. As a result, a power supply relay 21 is switched, a main power supply from a main battery 23 is supplied to the controller 10, and the controller 10 is driven.

[0027] In the operator's cabin 11, a parking brake 31 and an operating device 32 for operating the mixer drum 2 are arranged.

[0028] In the parking brake 31, a detector for detecting a lever position of the parking brake 31 is provided. When the parking brake 31 is operated, a vehicle stop signal is output from the detector to the controller 10.

[0029] In the operating device 32, a knob-type operation switch 32a for switching a rotating direction and a rotating speed of the mixer drum 2, a stop switch 32b for emergency stop of rotation of the mixer drum 2, and an automatic agitation switch 32c for automatically agitating and rotating the mixer drum 2 are provided.

[0030] On the basis of the operation of each of the operation switches 32a to 32c by the operator, an instruction signal is output from the operating device 32 to the controller 10. The controller 10 determines a target rotation state of the mixer drum 2 or more specifically the rotating direction and the rotating speed on the basis of the instruction signal.

[0031] Here, a rotating operation of the mixer drum 2 will be described. When the automatic agitation switch 32c is on, if there is no vehicle stop signal

from the parking brake 31 and the vehicle speed is at a predetermined speed or more, the controller 10 determines that the vehicle is running. As a result, the controller 10 automatically agitates and rotates the mixer drum 2 in order to prevent discharge of the ready-mixed concrete and to maintain a quality of the ready-mixed concrete.

[0032] On the other hand, when the automatic agitation switch 32c is off, the controller 10 allows backward rotation of the mixer drum 2 by operating the operating device 32 even if the vehicle is running. As a result, if the ready-mixed concrete is to be supplied to an elongated groove, for example, the ready-mixed concrete in the mixer drum 2 can be discharged to an outside while the vehicle is made to run at an extremely low speed. Moreover, when the vehicle stop signal is output from the parking brake 31, too, the controller 10 allows backward rotation of the mixer drum 2 by operating the operating device 32 so that the ready-mixed concrete in the mixer drum 2 can be discharged to the outside.

[0033] On a rear part of the mixer truck 100, a rear-part operating device 38 for allowing an operation of the mixer drum 2 outside the mixer truck 100 is arranged. In the rear-part operating device 38, similarly to the operating device 32, a knob-type operation switch 38a for switching the rotating direction and the rotating speed of the mixer drum 2, and a stop switch 38b for emergency stop of the rotation of the mixer drum 2 are provided. On the basis of the operation of the rear-part operating device 38 by the operator, an instruction signal is output from the rear-part operating device 38 to the controller 10.

[0034] The controller 10 controls the operations of the hydraulic pump 5 and the hydraulic motor 6 in accordance with the calculated rotating speed of the engine 3 so that the rotating direction and the rotating speed of the mixer

drum 2 are in the target rotation state. Specifically, the controller 10 calculates a discharge direction and a discharge capacity of the hydraulic pump 5 and the capacity of the hydraulic motor 6 so that the rotating direction and the rotating speed of the mixer drum 2 are in the target rotation state and outputs a control signal to the hydraulic pump 5 and outputs a two-speed switching signal to the hydraulic motor 6.

[0035] Into the controller 10, a load pressure signal is input from the hydraulic pump 5 through the pressure sensor 5a, and a rotating direction signal and a rotating speed signal are input from the hydraulic motor 6 through the rotation sensor 6a. The controller 10 controls the operations of the hydraulic pump 5 and the hydraulic motor 6 on the basis of these input signals.

[0036] Moreover, in the mixer truck 100, an automatic washing and kneading operating device 39 for allowing automatic washing inside the mixer drum 2 and a kneading operation of the ready-mixed concrete outside the mixer truck 100 is arranged.

[0037] In the prior-art mixer truck, during a discharge operation for discharging the ready-mixed concrete from the opening portion of the mixer drum, there is a problem that the discharge amount of the ready-mixed concrete pushed out by the rotating blades cyclically increases and decreases. Fig. 3A is a characteristic diagram illustrating a relation between the rotating angle of the mixer drum and the discharge amount of the ready-mixed concrete in the discharge operation in which the mixer drum is driven at a substantially constant rotating speed as a comparative example. In the mixer drum in which two blades are provided, the discharge amount of the ready-mixed concrete increases and decreases twice during one rotation of the mixer drum.

[0038] As a method against that, the controller 10 executes control for suppressing cyclic increase and decrease of the discharge amount (flow rate) of the ready-mixed concrete by lowering the target rotating speed of the mixer drum 2 each time the first and second blades 13 and 14 come to predetermined rotation positions (rotating angles) during the discharge operation of the mixer drum 2.

[0039] The controller 10 includes a rotation position determining unit 10A for determining that the first and second blades 13 and 14 have come to the predetermined positions and a rotating speed control unit 10B for cyclically correcting the target rotating speed of the mixer drum 2 lower on the basis of the determination result of the rotation position determining unit 10A during the discharge operation of the mixer drum 2.

[0040] In the mixer truck 100, a rotation switch 12 for outputting a signal in accordance with a rotation position of the mixer drum 2 is provided. The rotation switch 12 detects magnetic forces of first and second magnets 33 and 34 mounted on an outer periphery of the mixer drum 2 and outputs a rotation position signal with passage of the first and second magnets 33 and 34 to the rotation switch 12.

[0041] The first and second magnets 33 and 34 are arranged with a phase difference of 180 degrees to each other with respect to the rotation center axis O so as to correspond to the positions of the first and second blades 13 and 14.

[0042] The rotation switch 12 is not limited to the aforementioned constitution but may be a limit switch or the like which is brought into contact with a projection mounted on the outer periphery of the mixer drum 2 and operated to be on/off.

[0043] The rotation position determining unit 10A receives a detection signal of the rotation switch 12 and receives a detection signal of the rotating

speed V of the hydraulic motor 6 by the rotation sensor 6a. The rotation position determining unit 10A determines that the mixer drum 2 gets closer to the rotation position where the discharge amount of the ready-mixed concrete pushed out from the opening portion 2A by the first and second blades 13 and 14 increases during the discharge operation of the mixer drum 2 in accordance with the rotation position and the rotating speed of the mixer drum 2 on the basis of the detection signals of the rotation switch 12 and the rotation sensor 6a. Then, the rotation position determining unit 10A outputs a trigger signal at timing before the discharge amount of the ready-mixed concrete increases in accordance with the rotating speed V of the hydraulic motor 6.

[0044] The rotation position determining unit 10A is configured such that the higher the rotating speed V of the hydraulic motor 6 is, the earlier the timing when the trigger signal is output after receiving the detection signal of the rotation switch 12 is set with respect to operation delayed time of the driving device 4.

[0045] A method of detecting the rotating speed V of the hydraulic motor 6 is not limited to the aforementioned configuration that the signal of the rotation sensor 6a is received but may be configured such that the signal of the operation switches 32a and 38a for switching the target rotating speed of the mixer drum 2 are received.

[0046] The rotating speed control unit 10B receives a trigger signal from the rotation position determining unit 10A and calculates a discharge capacity of the hydraulic pump 5 so that the discharge amount of the ready-mixed concrete becomes constant by correcting the target rotating speed of the mixer drum 2 lower than the ordinary rotating speed.

[0047] The controller 10 outputs a control signal for controlling the operation of the hydraulic pump 5 so that the discharge capacity of the

hydraulic pump 5 calculated by the rotating speed control unit 10B is obtained.

[0048] Fig. 3B is a timing chart illustrating relations among the rotation position signal to the rotating angle of the mixer drum 2, the trigger signal, the target rotating speed of the mixer drum 2, and the discharge amount of the ready-mixed concrete. While the mixer drum 2 makes one rotation during the discharge operation of the mixer drum 2, the rotation position signal and the trigger signal rises twice, and the rotating speed of the mixer drum 2 is lowered twice. By controlling the operation of the hydraulic pump 5 so that the rotating speed of the mixer drum 2 cyclically lowers at timing corresponding to the rotation positions of the first and second blades 13 and 14, the cyclic fluctuation of the discharge amount of the ready-mixed concrete can be suppressed.

[0049] In the rotation position determining unit 10A, the higher the rotating speed V of the hydraulic motor 6 is, the earlier the timing when the trigger signal is output from receiving the detection signal of the rotation switch 12 is set. By changing the output timing of the trigger signal in accordance with the rotating speed V of the hydraulic motor 6, regardless of the change in the rotating speed V of the hydraulic motor 6, the rotation of the mixer drum 2 is decelerated at the rotation position where the discharge amount of the ready-mixed concrete is to increase. As a result, the cyclic fluctuation of the discharge amount of the ready-mixed concrete pushed out by the first and second blades 13 and 14 from the opening portion 2A can be suppressed.

[0050] According to the aforementioned embodiment, the mixer truck 100 includes the driving device 4 for rotating and driving the mixer drum 2 and the controller 10 for controlling the rotating speed of the mixer drum 2. And the

controller 10 includes the rotation position determining unit 10A for determining that the blades 13 and 14 have come to the predetermined rotation positions and the rotating speed control unit 10B for setting the rotating speed of the mixer drum 2 lower than the ordinary rotating speed on the basis of the determination result of the rotation position determining unit 10A.

[0051] In the mixer truck 100, during the operation in which the ready-mixed concrete is discharged to the outside from the mixer drum 2, the controller 10 controls (cyclically lowers) the rotating speed of the mixer drum 2 in accordance with the rotation positions of the blades 13 and 14. Therefore, the cyclic increase and decrease of the discharge amount of the ready-mixed concrete pushed out by the blades 13 and 14 can be suppressed. Since the ready-mixed concrete in a substantially constant flow rate is discharged from the mixer drum 2, when the ready-mixed concrete discharged from the opening portion 2A of the mixer drum 2 is input into a container such as a bucket, for example, fluctuation in an input amount of the ready-mixed concrete can be suppressed.

[0052] In the first embodiment, the rotation switch 12 for outputting the signal in accordance with the rotation position of the mixer drum 2 is provided in the mixer truck 100. The rotation position determining unit 10A determines that the blades 13 and 14 have come to the predetermined positions on the basis of the signal from the rotation switch 12.

[0053] As a result, the rotation position determining unit 10A can accurately determine that the blades 13 and 14 have come to the predetermined rotation positions on the basis of the signal of the rotation switch 12, and the discharge amount of the ready-mixed concrete is controlled with accuracy by the controller 10.

[0054]

(Second embodiment)

Subsequently, a second embodiment of the present invention will be described by referring to Fig. 4. Hereinafter, points different from the first embodiment will be mainly described, and the same reference numerals are given to the same constitution as that of the mixer truck in the first embodiment, and explanation will be omitted.

[0055] In the mixer truck according to the aforementioned first embodiment, the rotation switch 12 outputting a signal in accordance with the rotation position of the mixer drum 2 is used, but according to the mixer truck in the second embodiment, the similar control is executed by using the pressure sensor 5a.

[0056] The pressure sensor 5a outputs a load pressure signal according to a discharge pressure P of the hydraulic pump 5 to the controller 10. The discharge pressure P of the hydraulic pump 5 increases before the mixer drum 2 comes to the rotation position where the ready-mixed concrete discharge amount pushed out by the first and second blades 13 and 14 increases.

[0057] A rotation position determining unit 10C receives a detection signal of the pressure sensor 5a. Then, when the rotation position determining unit 10C determines that the detected discharge pressure P rises to a threshold value set in advance or more, it outputs a trigger signal. As a result, the trigger signal is output at timing before the discharge amount of the ready-mixed concrete pushed out by the first and second blades 13 and 14 from the opening portion 2A increases. The rotation position determining unit 10C may be configured to output the trigger signal when it determines that a rise rate of the detected discharge pressure P rises to the threshold value set in advance or more.

[0058] The rotation speed control unit 10B receives the trigger signal from the rotation position determining unit 10C and calculates a discharge capacity of the hydraulic pump 5 so that the discharge amount of the ready-mixed concrete becomes constant by setting the rotation speed of the mixer drum 2 lower than the ordinary rotation speed.

[0059] The controller 10 outputs a control signal to the hydraulic pump 5 so that the discharge capacity of the hydraulic pump 5 calculated by the rotation speed control unit 10B is obtained.

[0060] As a result, in the mixer truck 100, the rotation speed of the mixer drum 2 is lowered at timing according to the rotation positions of the first and second blades 13 and 14 during the discharge operation of the mixer drum 2, and the cyclic change of the discharge amount of the ready-mixed concrete pushed out by the first and second blades 13 and 14 from the opening portion 2A can be suppressed.

[0061] According to the aforementioned second embodiment, the pressure sensor (fluid pressure detector) 5a for detecting the discharge pressure P of the hydraulic pump 5 driving the hydraulic motor 6 is provided in the mixer truck 100. The rotation position determining unit 10C determines that the blades 13 and 14 have come to the predetermined positions on the basis of the signal from the pressure sensor 5a. As a result, the rotation position determining unit 10C can accurately determine the rotation position of the mixer drum 2 whose discharge amount of the ready-mixed concrete increases by using the characteristics that the discharge pressure P driving the hydraulic motor 6 increases and decreases in accordance with the rotation position of the mixer drum 2.

[0062] The embodiments of the present invention described above are merely illustration of some application examples of the present invention and

not of the nature to limit the technical scope of the present invention to the specific constructions of the above embodiments.

[0063] In the aforementioned embodiments, it is configured to determine that the blades 13 and 14 have come to the predetermined rotation positions on the basis of the signal of the rotation switch 12 or the pressure sensor 5a. This is not limiting, and by providing a rotating angle detector for detecting an absolute rotating angle of the mixer drum 2, control may be executed such that the rotating speed of the mixer drum 2 is cyclically lowered on the basis of the signal of the rotating angle detector.

[0064] The present application claims a priority based on Japanese Patent Application No. 2014-203630 filed with the Japan Patent Office on October 2, 2014, all the contents of which are hereby incorporated by reference.

# CLAIMS

1. A mixer truck, comprising:

a mixer drum configured to load ready-mixed concrete;

a blade provided inside the mixer drum and configured to push out the ready-mixed concrete from the mixer drum;

a driving device configured to rotate the mixer drum; and

a controller configured to control a rotating speed of the mixer drum, the controller comprising:

a rotation position determining unit configured to determine that the blade has come to a predetermined rotation position; and

a rotating speed control unit configured to set the rotating speed of the mixer drum lower than an ordinary rotating speed on the basis of a determination result of the rotation position determining unit.

2. The mixer truck according to claim 1, further comprising

a rotation switch configured to output a signal in accordance with the rotation position of the mixer drum, wherein

the rotation position determining unit determines that the blade has come to the predetermined position on the basis of a signal from the rotation switch.

3. The mixer truck according to claim 1, wherein

the driving device includes:

a fluid pressure pump configured to discharge an operating fluid;

a fluid pressure motor configured to be driven by the operating fluid discharged by the fluid pressure pump and to rotate the mixer drum; and

a fluid pressure detector configured to detect the fluid pressure driving the fluid pressure motor, and wherein

the rotation position determining unit determines that the blade has come to the predetermined position on the basis of a signal from the fluid pressure detector.

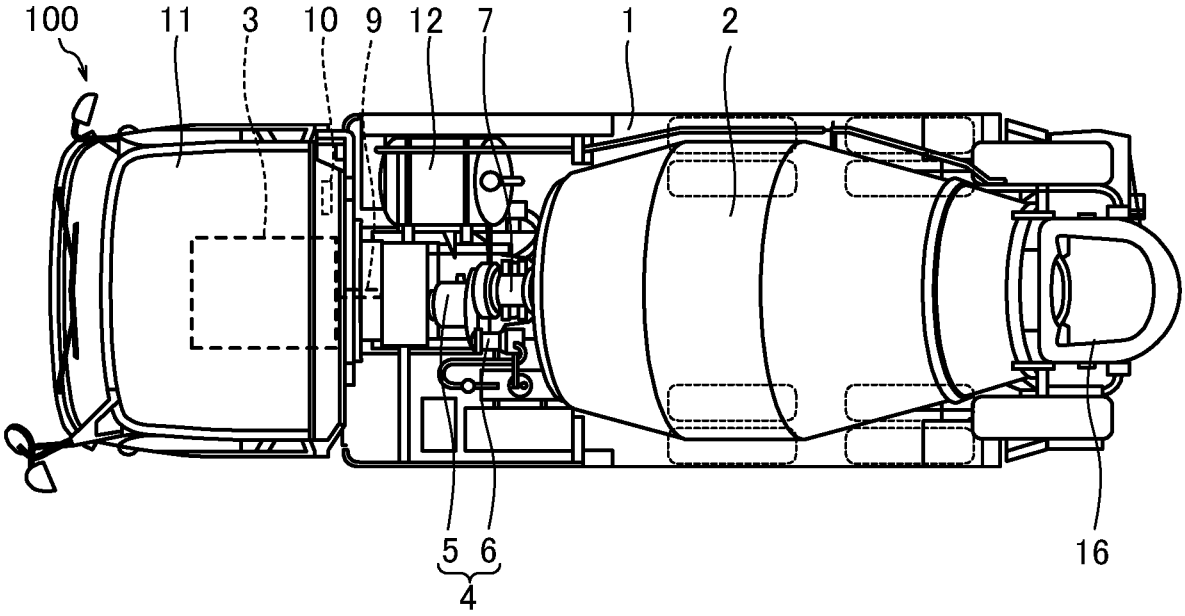


FIG. 1A

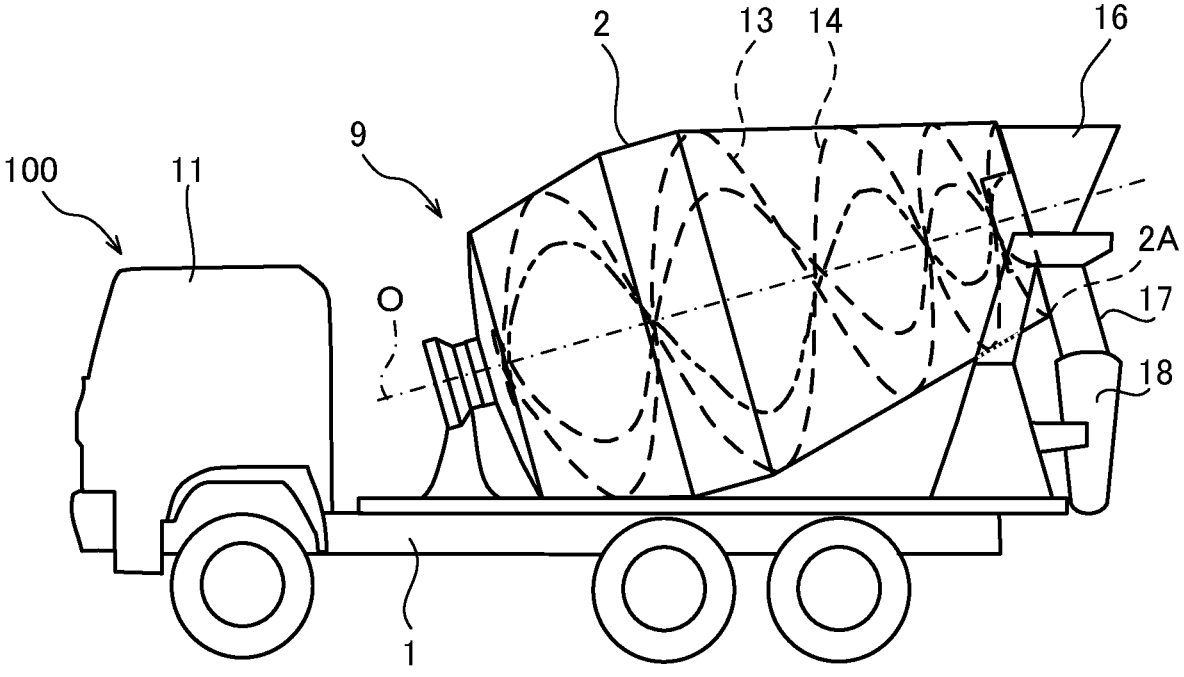


FIG. 1B

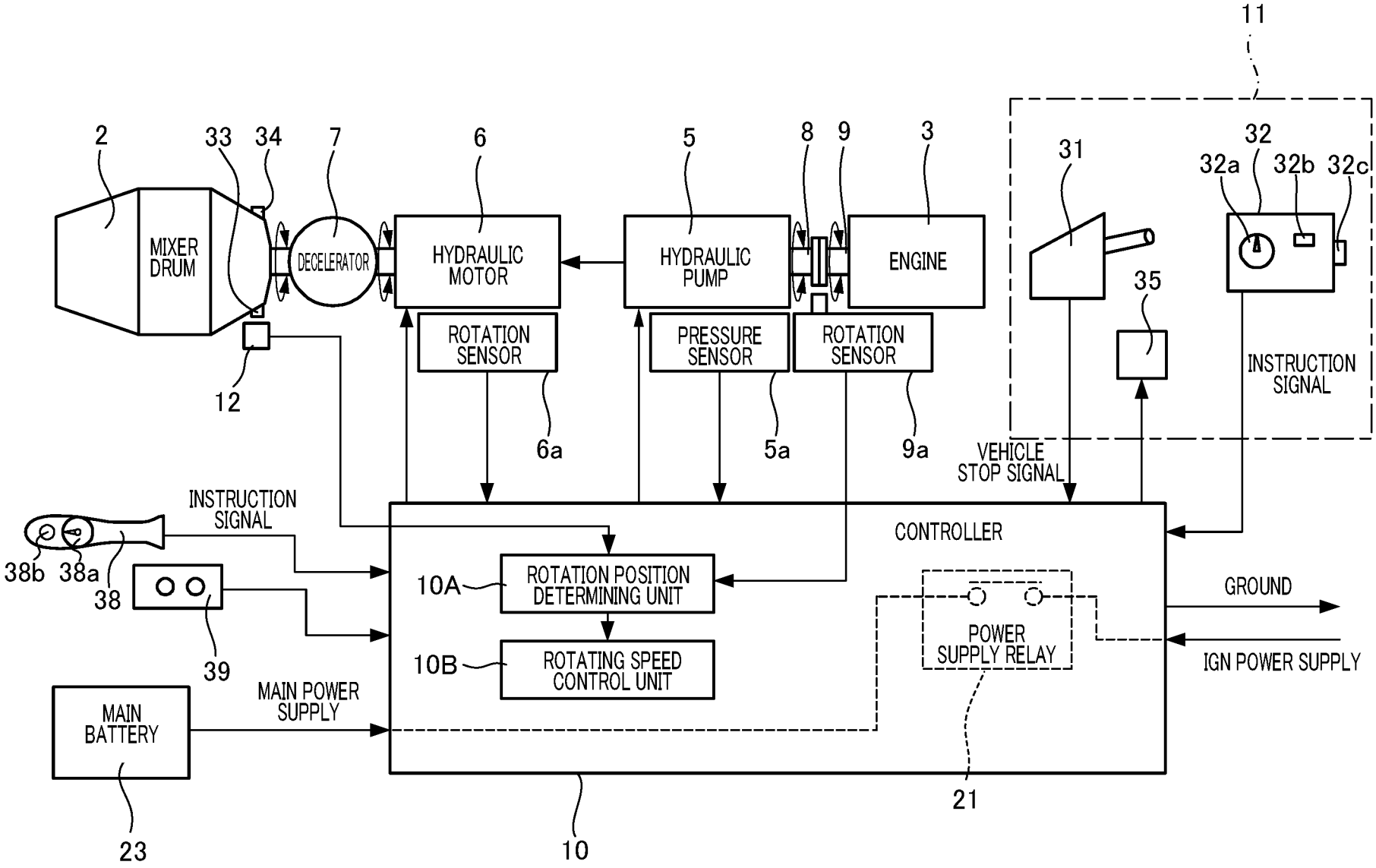
11
2
33
34
7
6
5
8
9
3
31
32
32a
32b
32c
MIXER DRUM
DECELERATOR
HYDRAULIC MOTOR
HYDRAULIC PUMP
ENGINE
35
ROTATION SENSOR
PRESSURE SENSOR
ROTATION SENSOR
INSTRUCTION SIGNAL
12
6a
5a
9a
VEHICLE STOP SIGNAL
INSTRUCTION SIGNAL
CONTROLLER
38b
38a
38
10A
ROTATION POSITION DETERMINING UNIT
GROUND
POWER SUPPLY RELAY
39
10B
ROTATING SPEED CONTROL UNIT
IGN POWER SUPPLY
MAIN POWER SUPPLY
MAIN BATTERY
21
23
10

FIG. 2

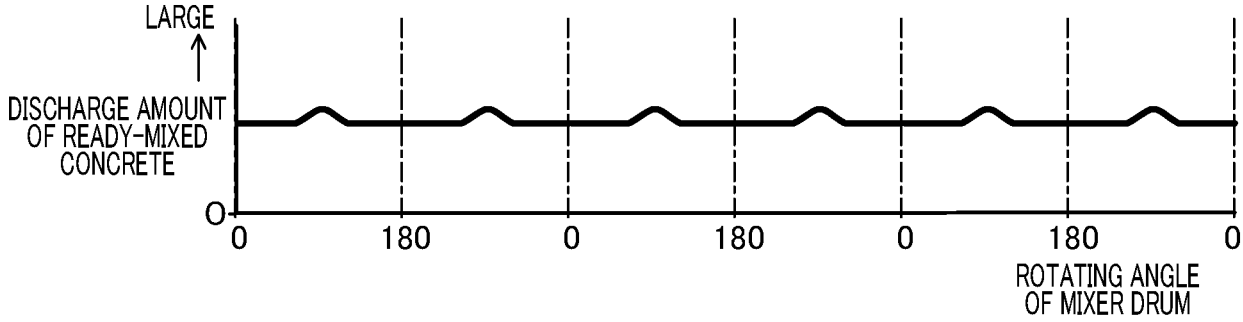
LARGE
DISCHARGE AMOUNT OF READY-MIXED CONCRETE
O
0
180
0
180
0
180
0
ROTATING ANGLE OF MIXER DRUM

FIG. 3A

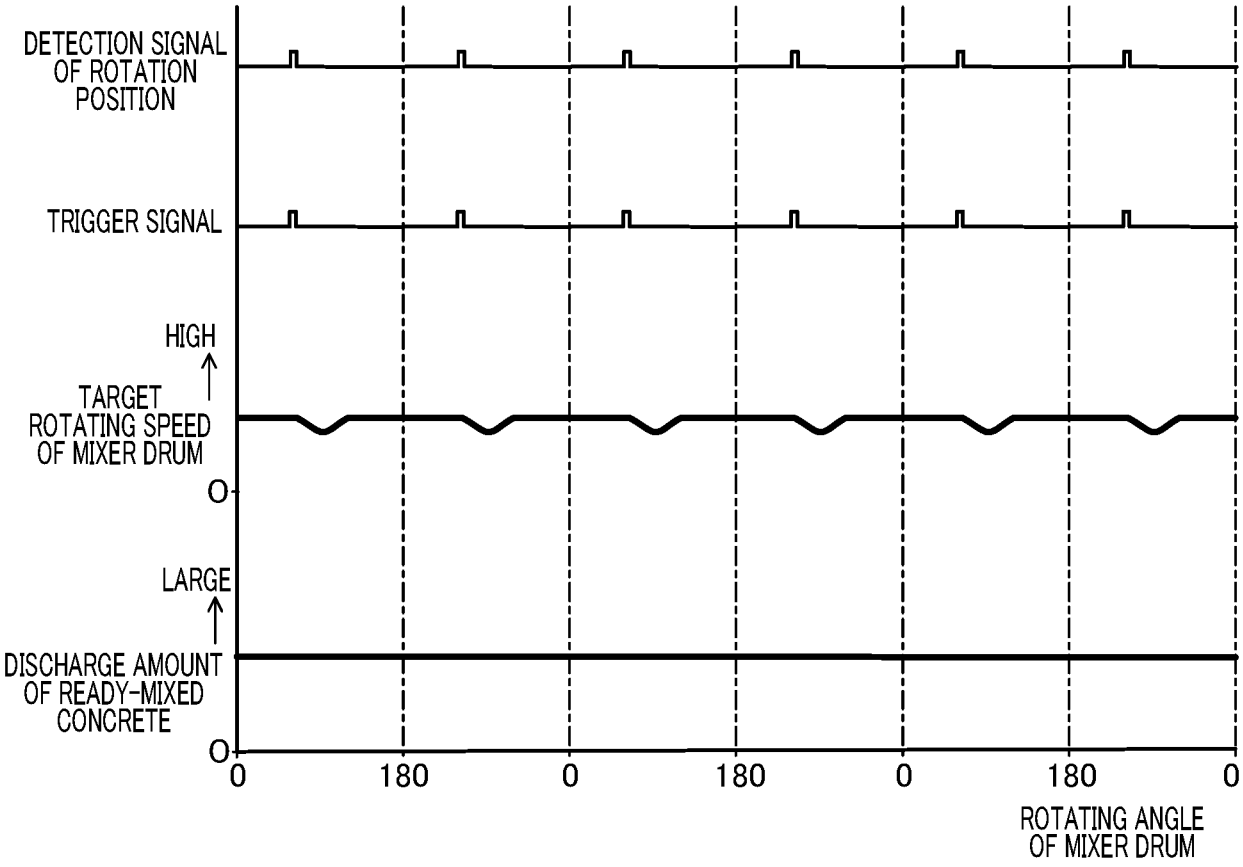
DETECTION SIGNAL OF ROTATION POSITION
TRIGGER SIGNAL
HIGH
TARGET ROTATING SPEED OF MIXER DRUM
O
LARGE
DISCHARGE AMOUNT OF READY-MIXED CONCRETE
O
0
180
0
180
0
180
0
ROTATING ANGLE OF MIXER DRUM

FIG. 3B

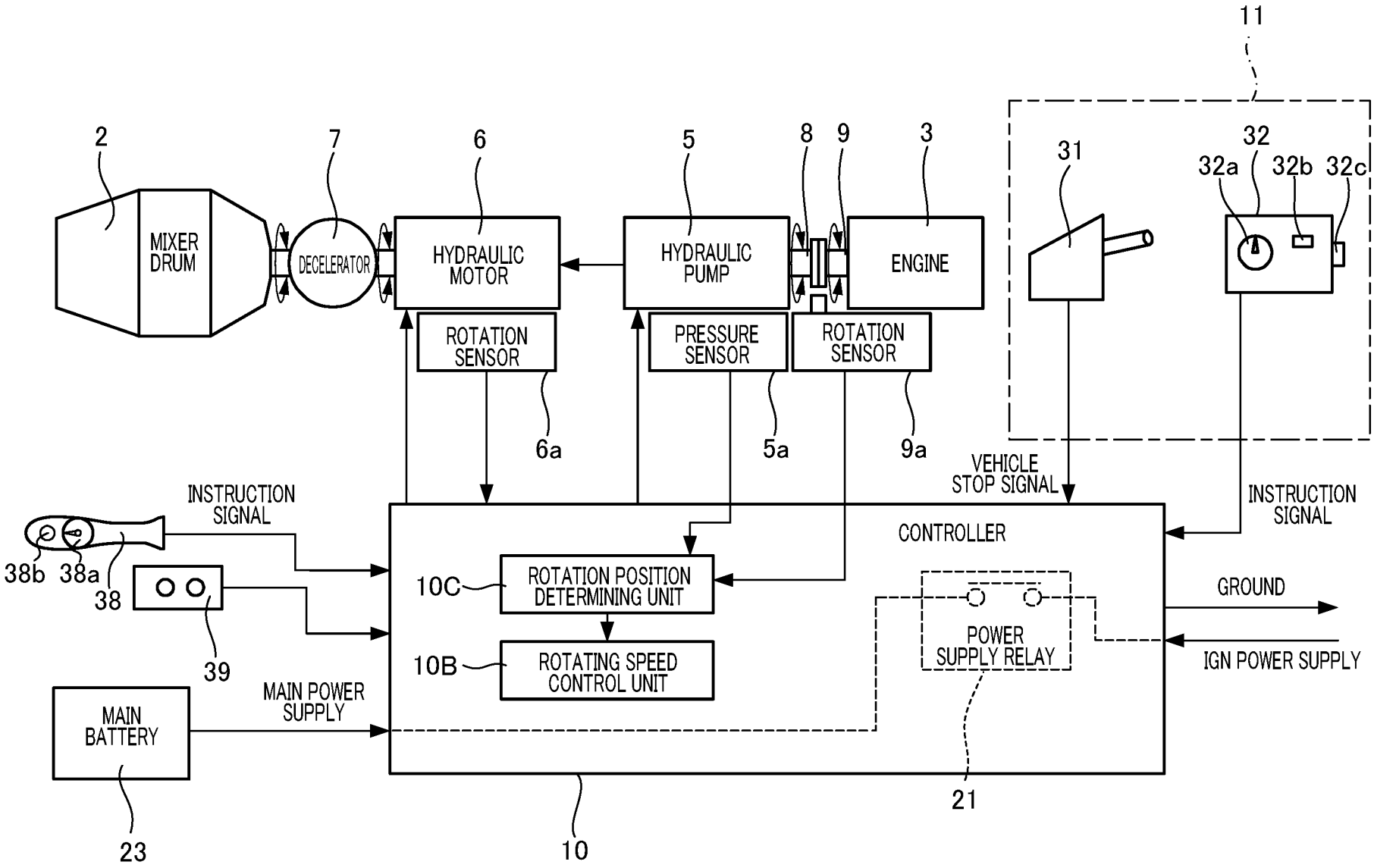
11
2
7
6
5
8
9
3
31
32
32a
32b
32c
MIXER DRUM
DECELERATOR
HYDRAULIC MOTOR
HYDRAULIC PUMP
ENGINE
ROTATION SENSOR
PRESSURE SENSOR
ROTATION SENSOR
6a
5a
9a
VEHICLE STOP SIGNAL
INSTRUCTION SIGNAL
INSTRUCTION SIGNAL
CONTROLLER
38b
38a
38
39
10C
ROTATION POSITION DETERMINING UNIT
10B
ROTATING SPEED CONTROL UNIT
POWER SUPPLY RELAY
GROUND
IGN POWER SUPPLY
MAIN POWER SUPPLY
MAIN BATTERY
23
10
21

FIG. 4